WINFIELD LOCKS & DAM
Main Lock
Upper Miter Gate Repairs

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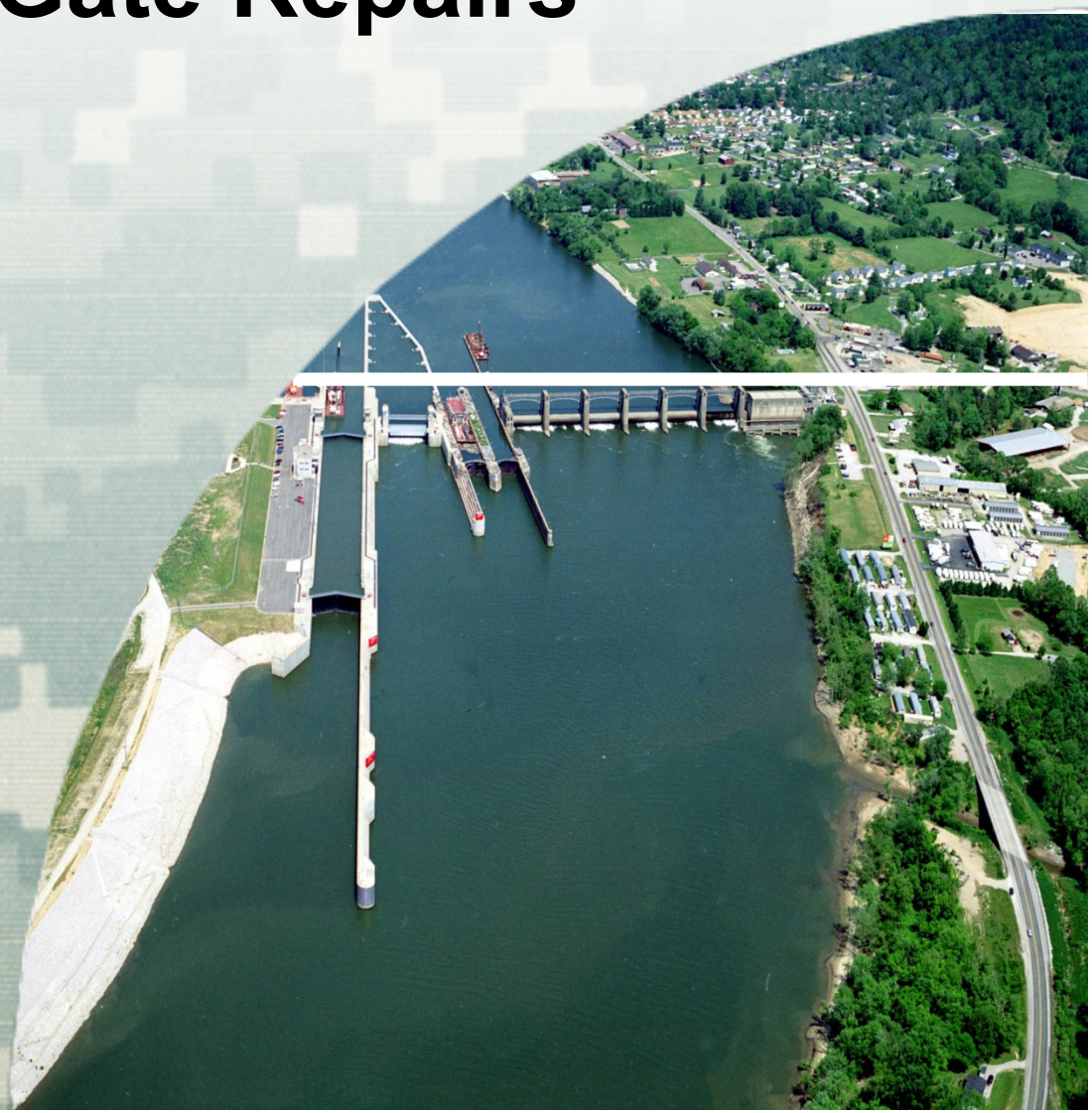
Huntington District

February 10, 2016



Winfield Locks & Dam

HISTORY

- LOCATION: Kanawha River, 31.1 miles from mouth at Winfield, WV
- LOCKS : Main Lock 110’ wide x 800’ long. Placed in service November 1997, Auxiliary Locks –twin locks 56’ wide x 360’ long, Placed in service September 1935
- DAM: Non-navigable, high-lift (28 feet), gated dam, Six roller type gates and one Tainter Gate that was part of the construction of new lock chamber
- COST: Original Project Construction Cost: $6,340,100.00

  New Lock and Gate Bay Construction Cost: $227,400,00.00

Winfield Locks & Dam

June 11, 2016: PLC system failed at Winfield Locks and Dam which forced lock personnel to operate the main lock from control boxes located on the upper and lower end of the chamber. The chamber was at high pool, with gates closed. The lockman started lowering the chamber from the lower operating station. Upper gates had drifted open and then slammed shut when chamber started draining.

DAMAGE:

1. Self Mitering Device Damaged

2. Gate Stop On Land Wall Gate Torn From Gate

3. Bottom Girder On Land Wall Gate Buckled

4. Gate out of Plumb at Miter End

Winfield Locks & Dam

REPAIRS:

1. Repaired Damaged Mitering Device
2. Fabricated and Installed New Gate Stop
3. Removed/Replaced Buckled Flange on Bottom Girder Straightened Web, Installed additional Diaphragm
4. Removed Miter Blocks to Allow Stressing of Diagonals
5. Stressed Diagonals to Plumb Gates
6. Repaired over 60 cracks in Gates
7. Removed/Replaced Gate Operating Cylinders with Spares (Piston rings and seals were worn which allowed gates to drift)
8. Fabricated and installed new bushings in Gate Castings and yoke for rod connection to gate
9. Installed Miter Blocks

Winfield Locks & Dam

Gate out of Plumb
Almost 3 Inches

After removing miter blocks and stressing diagonals gates were within ¼” from top to bottom

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Removed/Replaced Gate Operating Cylinder.
Fabricated and Installed New Gate Casting Bushings

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Buckled Bottom Girder on Upper Land Wall Gate Showing Section of Flange that was Removed and Replaced

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Using Hydraulic Jack
To Straighten Bottom
Girder Web

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New Flange Plate
Installed

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Added an intermediate diaphragm

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Discovered numerous cracks in both gates. These were ground out, welded and tested.

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New Gate Stop Installed on
Upper Land Wall Gate

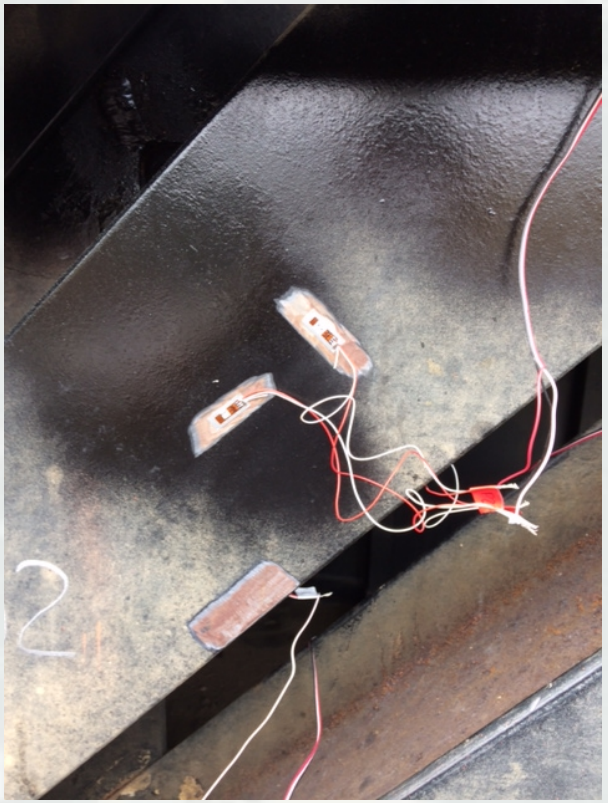
Winfield Locks & Dam

Gate pinned at top and jacked out at bottom to adjust diagonals running from bottom toe to upper heel.

100 ton jack was then placed at upper toe in saddle shown in the upper left corner of picture. Bottom toe was pinned. Diagonals running from upper toe to lower heel were adjusted.

Winfield Locks & Dam

Strain Gages attached in
A Wheatstone Bridge
Configuration



Winfield Locks & Dam

TIMELINE

Monday July 27, 2015 – Fleet started work on Auxiliary Lock with removal of Upper Middle Wall Gate. Gate anchorage was removed and replaced.

Monday August 10, 2015 – Fleet started dewatering Upper Gates

Friday October 09, 2015 – Work Complete, Fleet Departs Winfield

Questions?